NOTES TO ARCHITECT

Add to specifications as necessary if other finishes are to beused.

SECTION 03100 - CONCRETE FORMWORK

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00800.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials or equipment shall be used under this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.

B. Plywood shall be commercial-standard Douglas Fir, moisture resistant concrete form plywood not less than 5-ply and at least 5/8" thick.

C. Metal forms may be used if they will produce surfaces equal to those specified for wood forms.

D. Forms of other materials shall not be used unless approved by the Engineer.

E. Metal clamps and ties shall be used. Form ties for exposed concrete shall be removable either completely or to a minimum depth of 1" from the face of the concrete.

PART 3 - EXECUTION

3.01 TOLERANCES

A. Forms shall be constructed so that the concrete surfaces do not deviate from established lines, grades and dimensions in excess of the tolerances listed below:

1. Variations from plumb:

a. In the lines and surfaces of columns, piers, walls, and in arrises:

In any 10 ft. of ht.:	1/4"
Max. for the entire ht. of structure:	1"

b. For exposed corner columns, control-joint grooves, and other conspicuous lines:

In any 20 ft. of length	1/4"
Max. for the entire length	1/2"

2. Variation from the level or from the grades specified in the contract documents:

a. In slab soffits, ceilings, beam soffits and in arrises, measured before removal of supporting shores:

In any 10 ft. of length	1/4"
In any bay or in any 20 ft. length	3/8"
Max. for the entire length	3/4"

b. In exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines:

In any bay or in 20 ft. length	1/4"
Max. for the entire length	1/2"

3. Variation of the linear building lines from established position in plan and related position of columns, walls and partitions:

In any bay	1/2"
In any 20 ft. of length	1/2"
Max. for the entire length	1"

4. Variation in the sizes and location of sleeves, floor openings, and wall openings:

Plus or Minus	1/4"

5. Variation in cross-sectional dimensions of columns and beams and in thickness of slabs and walls:

Minus	1/4"
Plus	1/2"

NOTES TO ARCHITECT

6. Footings: Tolerances apply to concrete dimensions only, not to positioning of vertical reinforcing steel, dowels, or embedded items:

   a. Variations in dimensions in plan:

Minus	1/2"
Plus	2"

   b. Misplacement or eccentricity:

      2% of the footing width in the direction of misplacement but not more than 2"

   c. Thickness:

Decrease in specified thickness	5%
Increase in specified thickness	No Limit

7. Variation in steps:

   a. The largest tread run within any flight of stairs shall not exceed the smallest by more than 3/8". The greatest riser height shall not exceed the smallest by more than 3/8".

3.02 INSERTS, FASTENING DEVICES AND CONDUITS

A. Install inserts, reglet strips, hangers, metal ties, anchors, bolts, nailing strips, blocking, grounds and other fastening devices as required for attachment of other work. Properly locate all embedded items in cooperation with other trades and secure in position before concrete is placed.

Be sure to show all embedded items on plan details, including nailing strips for roofing as required for roof decks having high slopes (2' per foot and up).

B. All electrical and mechanical conduits and fittings shall be located such that they do not impair the strength of the concrete member and shall be subject to acceptance by the Engineer. Conduits referred to in the items below include pipes, ducts, and electrical conduits. Conduits and fittings shall conform to the following, unless shown on structural drawings:

NOTES TO ARCHITECT

1. Concrete Columns:

   a. Electrical conduits and other pipes and fittings may not be embedded in a column if they will displace more than 4% of the cross-sectional area of the column.

   b. Conduits in columns shall not be larger in outside diameter than 1/3 the least dimension of the column.

2. Concrete Walls:

   a. Conduits larger than 1-inch outside diameter shall not be embedded vertically in any wall. Conduits shall be spaced a minimum of 10 times outside diameter and shall be placed in the middle of the wall thickness.

   b. No conduits shall be embedded horizontally in any wall, lengthwise.

   c. Conduits passing through walls shall not impair the strength of the wall and shall be provided with Schedule 40 galvanized steel pipe (ASTM A 53) sleeve.

3. Concrete Beams:

   a. Conduits larger than 1-1/2 inches outside diameter shall not be embedded vertically in any beam. Conduits embedded vertically shall be spaced a minimum of 10 times outside diameter and shall be placed in the middle third of the beam thickness.

   b. No conduits shall be embedded horizontally in any beam lengthwise.

   c. Conduits passing through beams shall not impair the strength of the beam and shall be provided with Schedule 40 galvanized steel pipe (ASTM A 53) sleeve.

Coordinate all electrical and mechanical conduits, ducts, fittings and fixtures embedded in or penetrating structural members. Show and properly reinforce all major embedded items and penetrations on the structural drawings. Check structural integrity when allowing horizontal runs in beams and walls. For thin toppings, check clearances with rebar and also for possible cracking. Modify guidelines to meet specific job requirements.

NOTES TO ARCHITECT

4. Suspended Concrete Slabs and Toppings:

   a. Conduits larger than 1 inch outside diameter shall not be embedded in any concrete slab or topping. Conduits shall be spaced a minimum of 10 times outside diameter. Conduit crossings shall be avoided.

   b. Conduits passing through slabs shall be provided with Schedule 40 galvanized steel pipe (ASTM A 53) sleeve.

5. Concrete Slabs on Grade:

   a. Conduits shall not be embedded within the thickness of any concrete slab on grade.

   b. Conduits may be placed in the subgrade below the bottom surface of slabs on grade, but not within the thickness of the basaltic termite barrier.

C. Where a number of pipes are intended to penetrate a structural member at a location which may unduly impair the strength of the member, such as near the face of a column, the Engineer shall be informed and his approval must be obtained before concrete is placed.

D. The Contractor shall coordinate the installation of all embedded items and penetrations. Cost of any added reinforcement required at pipe and conduit penetration and embedment shall be borne by the Contractor.

3.03 CONSTRUCTION OF FORMS

A. All concrete forms shall be placed with metal clamps and ties. Locate ties level and plumb in horizontal rows and vertical tiers.

B. Where soil conditions will permit excavation to accurate sizes without bracing, side forms for footings may be omitted only if approved by the Engineer.

C. Temporary access openings to forms for cleaning prior to depositing of concrete shall be provided.

D. Unless otherwise called for on the plans, all exposed concrete surfaces and/or all surfaces designated as "Architectural Concrete" on the plans shall be formed with plywood. The arrangement of the plywood sheets shall be orderly and symmetrical and shall be of 4' x 8' size wherever practicable.

Add to specifications as necessary if other finishes are to be used.

Only new or unmarred plywood shall be used. A 3/4" by 3/4" chamfer shall be provided at external corners of exposed concrete beams, girders, columns and pilasters unless otherwise indicated on the plans. Metal forms may be used if they will produce surfaces equal to those specified for wood forms.

E. Rough concrete finish may be used for all unexposed concrete surfaces as indicated in Section 03300 or on the plans. Rough concrete finish shall be obtained by using clean, straight lumber or metal forms.

F. Forms for architectural concrete surfaces or on exposed surfaces which are to receive a finishing material shall be either wetted thoroughly immediately before placing concrete or coated with a bond-breaking material compatible with the finishing material and/or its adhesive prior to the placement of reinforcing steel. Forms for unexposed surfaces may be coated with form oil. However, any surplus oil on the form surfaces and any oil on the reinforcing steel shall be removed by wiping with dry rags.

G. Forms which cannot be removed shall be of material other than wood and must be approved by the Engineer.

H. All forms other than for the non-removable form described under the preceeding subparagraph shall be constructed so that they can be removed without hammering or prying against the concrete.

I. Forms shall not be removed before the expiration of the minimum lapsed time from concrete pour shown below unless information and/or data justifying a request for a shorter period is submitted to and approved by the Engineer. Even with such approval, however, the Contractor shall be fully responsible to repair any damages which may result from the early removal.

Bottom forms of beams and girders	14 days
Walls, columns and side forms of beams	3 days
Footing side forms	24 hours
Bottom forms of slabs	14 days

No construction loads exceeding the structural design live loads shall be supported upon any unshored portion of the structure under construction. No construction load shall be supported upon, nor any shoring removed from any part of the structure under construction until the portion of the structure has attained sufficient strength to support safely its weight and the loads placed thereon. This strength may be demonstrated by job-cured test specimens and by a structural analysis considering the proposed loads in relation to this test strength. Such analysis and test data shall be furnished by the Contractor to the Engineer.

J. To maintain the tolerances specified in Paragraph 3.01, the formwork shall be cambered to compensate for anticipated deflections in the formwork prior to hardening of the concrete.

K. Screeds for slabs:

1. Edge forms and intermediate screed strips shall be set accurately to produce the designated elevations and contours of the finished surface, and shall be sufficiently strong to support vibrating screeds or roller pipe screeds if the nature of the finish specified requires the use of such equipment.

   The concrete surface shall be aligned to the contours of screed strips by the use of strike-off templates or approved compacting type screeds. Screeds shall be set adjacent to all walls and in parallel rows not to exceed 8 feet o.c. Penetrations of the moisture barrier shall be held to a minimum.

2. At walks, screeds shall be set at the sides to serve as forms and additional screeds, if required, shall be spaced not exceeding 8 feet o.c.

END OF SECTION